

LEACHATE MONITORING PLAN**Piedmont Landfill & Recycling Center****1.0 INTRODUCTION****1.1 Purpose**

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The purpose of this document is to present the leachate management plan for the Piedmont Landfill and Recycling Center near Kernersville, North Carolina. The goal of this plan is to document leachate monitoring and thereby protect against any adverse impact on the environment. This plan has been developed to meet the requirements of the North Carolina Department of Health, Environment, and Natural Resources.

1.2 Operational History

The Piedmont Landfill and Recycling Center (PLFRC) was permitted by the NC Department of Environment, Health, and Natural Resources in February 1989. The Permit, No. 34-06, was issued to Waste Management of Carolinas, Inc.(WMCI). This landfill has always been owned and operated by WMCI. The PLFRC began accepting waste on June 11, 1990.

The landfill was designed by WMNA, as a single composite liner, i.e. 18 inches of recompacted clay w/HDPE. The leachate collection system consisted of a single geonet w/protective layer. The initial modules constructed, Phase 1 Modules 1,2, were constructed per this design. However, a major redesign was approved by the NCDEHNR whereby the next two modules, Phase 1 Modules 5,6, were constructed as a double liner system, i.e. 60 mil HDPE, geonet, Typar geotextile (secondary collection system), Claymax, 60 mil HDPE, and sand drainage blanket with perforated PVC pipe. In June 1992, the NCDEHNR approved plans for future modules to be consistent with this double liner system.

Based on the anticipated daily volumes and the landfill size, the site has a projected life of approximately twenty years.

2.0 LEACHATE MANAGEMENT SYSTEM**2.1 Liner and Leachate Collection System**

A single composite liner and geonet/leachate collection piping has been installed in Phase I Modules 1 and 2. A double liner system has been constructed in Phase 1 Modules 5,6. and also Phase II, Modules 1,2, & 3. A description of the liner and leachate collection system in place at PLFRC may be found below.

2.1.1 Phase I, Modules 1,2

The liner system in Phase I Modules 1,2, consists of 18 inches of recompacted clay with a maximum permeability of 1×10^{-7} cm/sec. overlaid by a 60 mil HDPE geomembrane. The leachate collection system consists of geonet and perforated PVC collection pipes. Six (6) inch perforated PVC pipe was placed in leachate collection trenches, covered with washed gravel and wrapped in geotextile. Atop this geonet/pipe system is a 16 oz/sy geotextile. This geotextile is then overlaid by 24 inches of a sand protective layer. This system was designed to permit leachate to drain by gravity to the trenches, which in turn drain to leachate collection sumps for removal. There exists one sump for Module 1 (Sump No. 1) and one sump for Module 2 (Sump No. 2).

2.1.2 Phase I, Modules 5,6; Phase II, Modules 1,2,3

The liner/leachate system in these modules consist of the following from bottom to top: subgrade, 60 mil HDPE, geonet (secondary system), Typar geotextile, Claymax, 60 mil HDPE, and two feet of sand drainage blanket with six (6) inch perforated PVC pipe (primary system). The leachate collection pipes are located in trenches covered with washed gravel and then wrapped in geotextile. The two foot sand drainage blanket has a minimum permeability of 1×10^{-2} cm/sec.. This system was designed to permit leachate to drain by gravity to the trenches, which in turn drain to leachate collection sumps for removal. There exists one sump for Modules 5,6 (sump No. 5 &6). This one sump consists of two compartments, a primary and secondary one. There exists two sumps for Phase II, Modules 1,2,3 (Sump No. 7 on the south side, in Module 3, and Sump No. 4 on the north side, in Module 1). Each sump has two compartments, a primary sump and a secondary one.

2.2 Leachate Storage

Once the leachate leaves the sumps, its primary course is to enter the storage tanks located within the confines of the landfill property located south of Freeman Road. There presently exists two (2), 6200 gallon storage tanks yielding a total storage capacity of 12,400 gallons. More tanks can be added as the need arises.

3.0 LEACHATE MONITORING

3.1 Head Level Monitoring

Primary Leachate Collection:

The method used to determine head levels at each of the sumps varies. In Sumps 1 & 2, and 5 & 6 (primary) there are electrical float switches located at certain levels in the sump. Two of the float switches operate the sump pump (on/off). The other switch, located 1.0 vertical foot above the liner at the sump, operates a signal light located on a nearby electrical panel. The other switches, that operate the pump, are located *below* the warning light switch. Daily logs are kept (such as the one in Appendix 1) noting whether the warning lights are "on" or "off",

meaning whether the leachate levels has or has not exceeded this 1 foot level.

In Sumps 7 and 4 (primary), there are pressure transducers, or sensors, located within the down riser sump pump housing. One of these transducers operates a warning light located at each sump but it also gives a digital readout as to the liquid level in each sump. This transducer has been adjusted such that the warning light will come "on" when the head level is at 1 vertical foot above the liner at the sump. In addition to this, these sensors operate the pumps (on/off) and The other transducers that operate the pump, are adjusted such that the pump will be signaled to come "on" prior to reaching this 1 foot level. Daily logs are kept (such as the one in **Appendix 1**) noting whether the warning lights are "on" or "off", meaning whether the leachate levels has or has not exceeded this 1 foot level.

Secondary Leachate Collection:

There is no secondary leachate collection system for Phase I, Modules 1,2.

The secondary Sump 5&6 has an electrical float switch, located 4.5 feet above the floor of the secondary sump that operates a warning light. This light is connected to an electrical panel constructed adjacent to the sump. Daily logs are kept (such as the one in **Appendix 1**) noting whether the warning light is "on" or "off", meaning whether the leachate level has or has not exceeded the 4.5 foot level.

In Sumps 7 and 4 (secondary), there are pressure transducers, or sensors, located within the down riser sump pump housing. One of these transducers operates a warning light located at each sump but it also gives a digital readout as to the liquid level in each sump. This transducer has been adjusted such that the warning light will come "on" when the head level is at 1 vertical foot above the primary liner at the sump. In addition to this, these sensors operate the pumps (on/off) and The other transducers that operate the pump, are adjusted such that the pump will be signaled to come "on" prior to reaching this 1 foot level. Daily logs are kept (such as the one in **Appendix 1**) noting whether the warning lights are "on" or "off", meaning whether the leachate levels has or has not exceeded this 1 foot level.

3.2 Collection System Leachate Quantity Monitoring

3.2.1 Primary Leachate Collection

Each primary sump will be equipped with a metering device to determine the quantity of leachate pumped from that particular sump. Monthly logs are kept (such as the one in **Appendix 1**) noting the quantities pumped.

3.2.2 Secondary Leachate Collection

Once a month, or approximately every 30 days, the PLFRC will determine the quantity of leachate contained in each sump's secondary collection system. The PLFRC will then determine by calculations if a "trigger level" has been reached. If the "trigger level" has exceeded 20

gallons per acre per day, the NCDEHNR will be notified. For informational purposes, the area associated with Sump 5,6 secondary system is 10.0 acres. The area that drains to Sump 7 is 7 acres, with the first stormwater flap intact. The area that drains to Sump 4 is 6 acres. Monthly logs are kept (such as the one in Appendix 1) noting the quantities and "trigger" level achieved.

3.3 Frequency of Head Level Monitoring

Primary system head levels will monitored, on a daily basis, whether the head is above or below the specified requirement of 1.0 vertical feet above the liner. See Section 3.1 above for further information.

The PLFRC does not expect the secondary system head to reach the 4.5 foot float switch required by the NCDEHNR Solid Waste Permit. However, leachate head levels will be determined as per Section 3.1.

4.0 LEACHATE STORAGE and DISPOSAL

4.1 Method of Storage

All leachate sumps are connected to a storage tank facility located across Freeman Road. The underground piping system connecting these sumps to the tanks consists of 4 inch double walled HDPE (outer pipe is 6 inch). At the present time, the main collection line discharges into two (2), 6200 gallon HDPE storage tanks, connected in series, giving a total storage capacity of 12,400 gallons. More tanks will be added as the need arises.

The leachate is removed from these tanks via a dedicated pump (located within the concrete block wall containment area) and transferred to tanker trucks. The tanker truck off-loading area is located immediately adjacent to this pump station.

Since it will be difficult at times to distinguish between rainwater and leachate, any rainwater that falls within the secondary containment area will be collected in a small sump within this containment area and pumped off as leachate.

4.3 Method of Transportation

The tanker trucks access the off-loading area by use of the service road and parking the tanker truck such that the tanker portion lies within the secondary spill containment area. This area is capable of holding the contents of the largest tanker compartment. The driver then hooks the hose to the outlet side of the discharge pump. Once hooked to his truck, the driver will then unlock the electrical control panel and operate the appropriate switches to load his vehicle. Upon completion of loading the vehicle, the switches will be turned off, control panel locked, and gate locked prior to leaving the area.

APPENDIX 1

Secondary Leachate Collection and Removal System Monthly Accumulation Rate

Date Pumped	Gallons Pumped	Days Between Pumpings	Accumulation Rate
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This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings present.
$$\text{Accumulation Rate} = \frac{\text{Gallons Pumped}}{(\text{Days between Pumpings})(6.0 \text{ ac})} = \text{gal/ac/day}$$

Secondary Leachate Collection and Removal System Monthly Accumulation Rate

Date Pumped	Gallons Pumped	Days Between Pumpings	Accumulation Rate
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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.
$$\text{Accumulation Rate} = \frac{\text{Gallons Pumped}}{(\text{Days between Pumpings}) (7.0 \text{ ac})} = \text{gal/ac/day}$$

Secondary Leachate Collection and Removal System Monthly Accumulation Rate

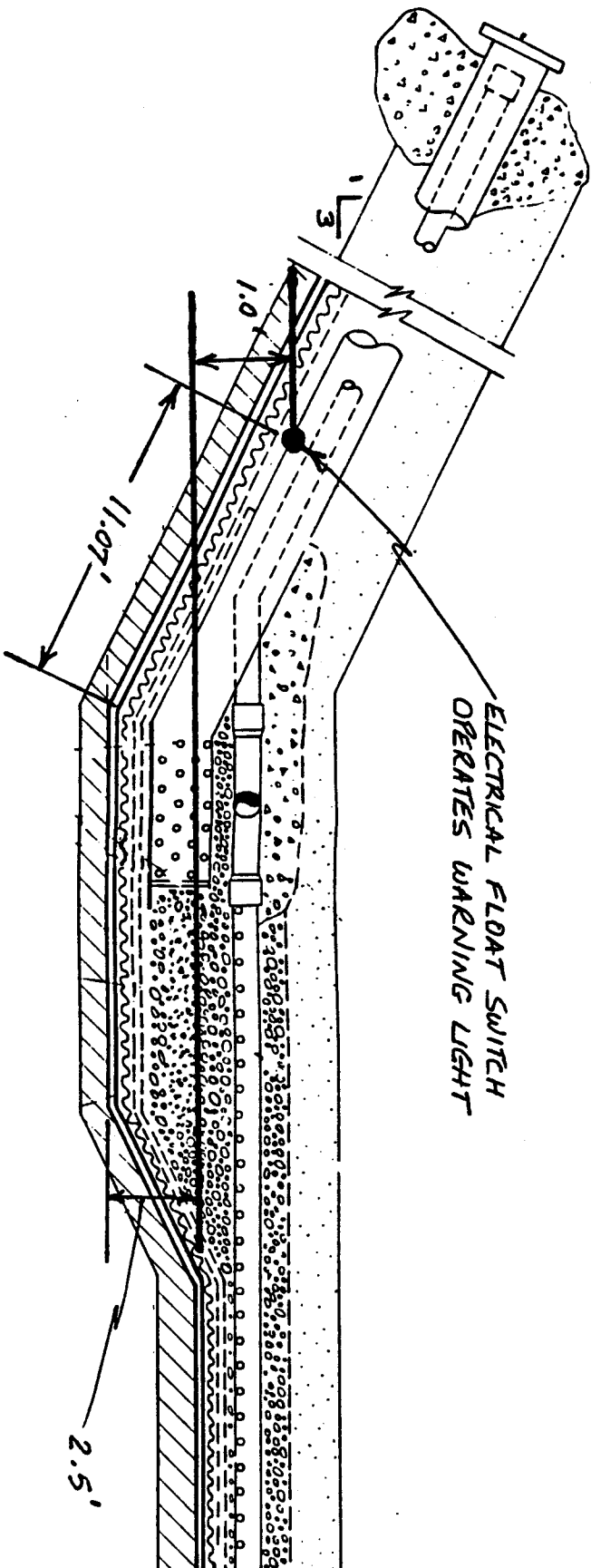
Date Pumped	Gallons Pumped	Days Between Pumpings	Accumulation Rate
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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.
$$\text{Accumulation Rate} = \frac{\text{Gallons Pumped}}{(\text{Days between Pumpings})(10.0 \text{ ac})} = \text{gal/ac/day}$$

Leachate Collection and Removal System Monthly Quantities

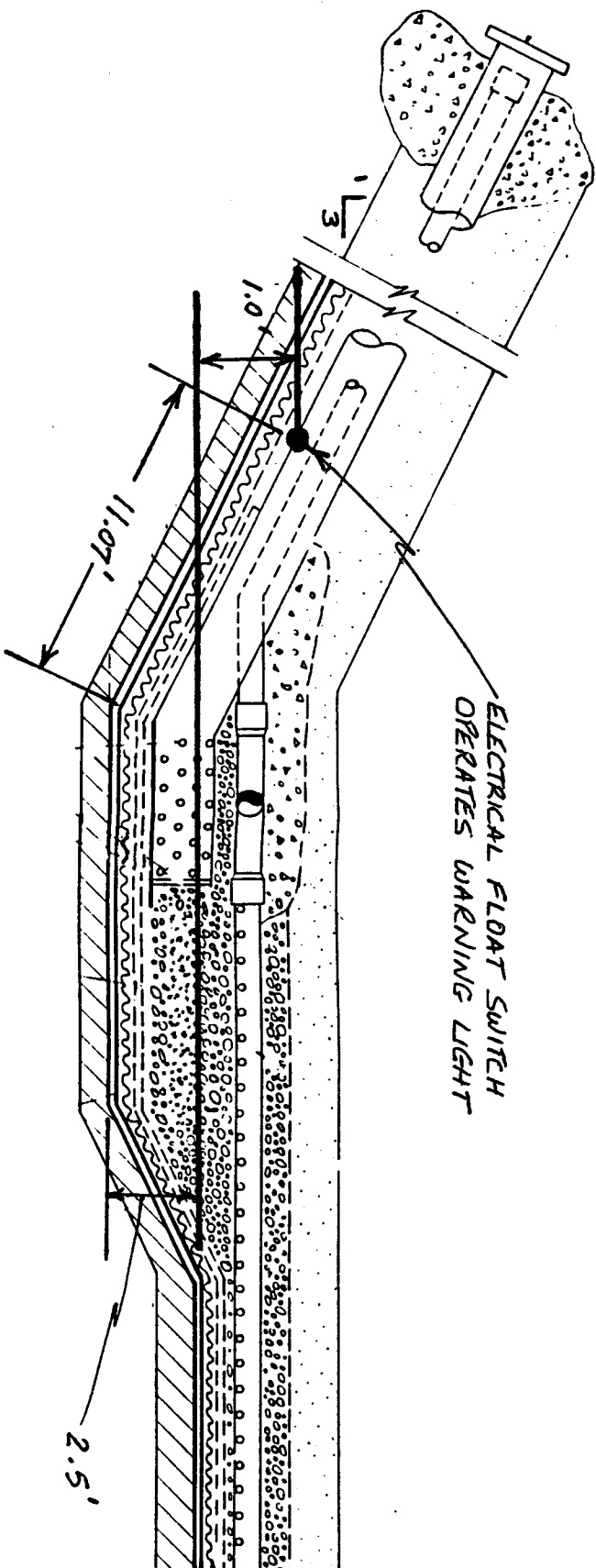
Date	Sump Number	Meter Reading	Meter Reading Difference (volume)
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[illegible]



SUMP NO. 1 ELECTRICAL FLOAT SWITCH LOCATION NTS

PIEDMONT LANDFILL AND
 RECYCLING CENTER
 A DIVISION OF
 WASTE MANAGEMENT OF
 CAROLINAS, INC.
 KERNERSVILLE, NC
 FORSYTH COUNTY, NORTH CAROLINA

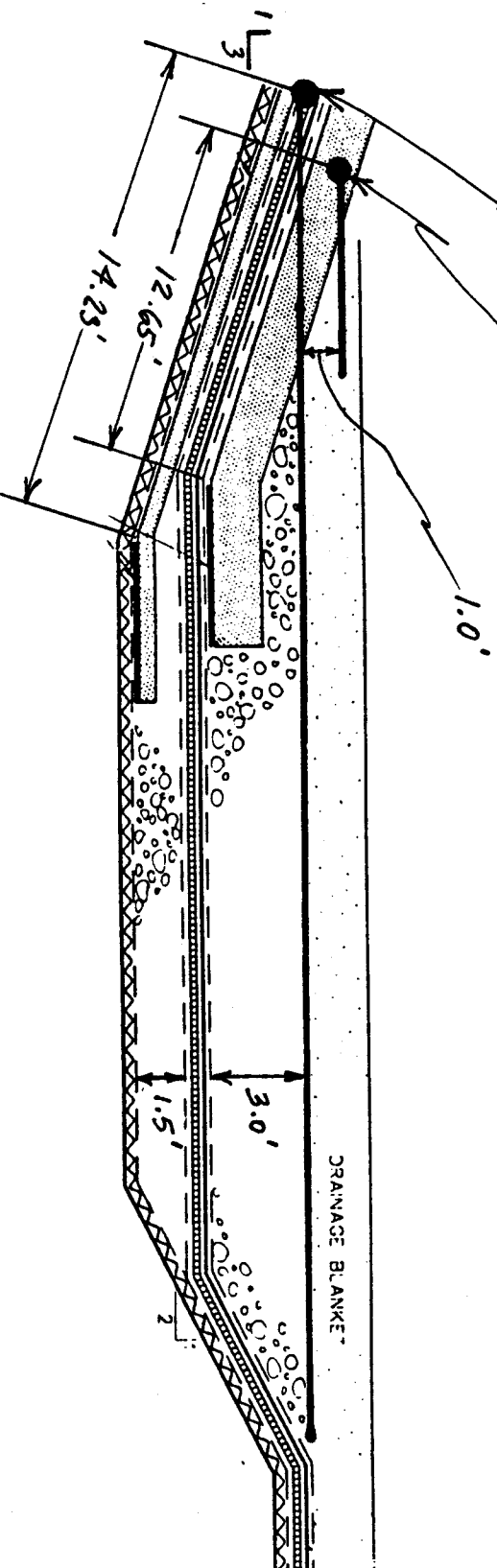


SUMP NO. 2 ELECTRICAL FLOAT SWITCH LOCATION NTS

KERNERSVILLE
 WASTE MANAGEMENT OF
 A DIVISION OF
 FORSYTH COUNTY, NORTH CAROLINA
 PIEDMONT LANDFILL AND
 RECYCLING CENTER

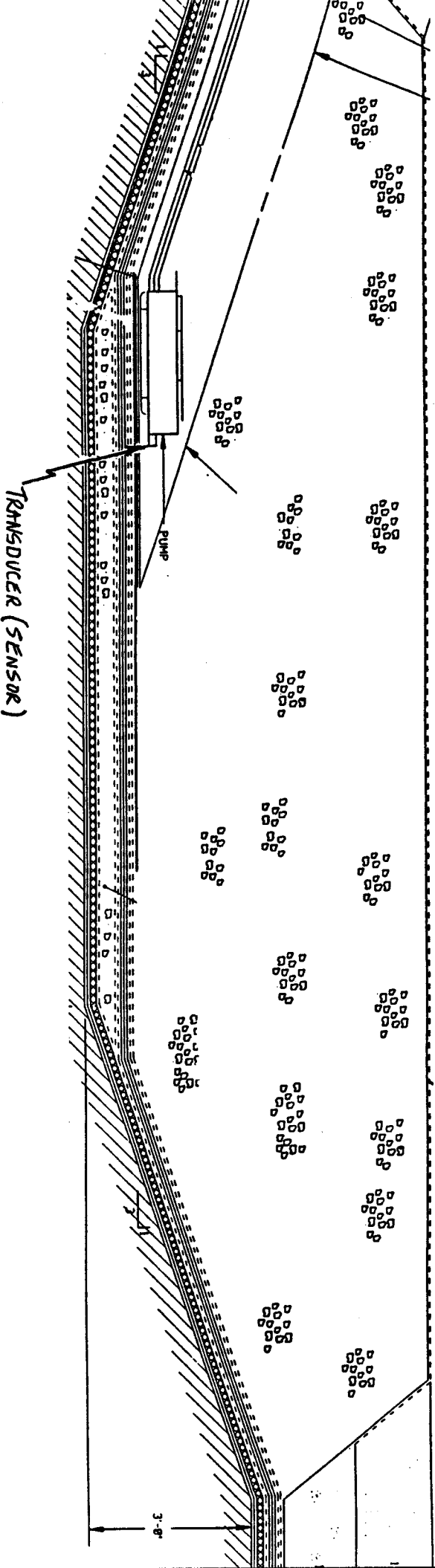
SECONDARY LCS ELECTRICAL FLOAT SWITCH OPERATES WHENINING LIGHT

PRIMARY LCS ELECTRICAL FLOAT SWITCH OPERATES WHENINING LIGHT



SUMP NO. 5,6 ELECTRICAL FLOAT SWITCH LOCATION NTS

PIEDMONT LANDFILL AND
RECYCLING CENTER
A DIVISION OF
WASTE MANAGEMENT OF
CAROLINA, INC.
KERNERSVILLE
FORSYTH COUNTY, NORTH CAROLINA

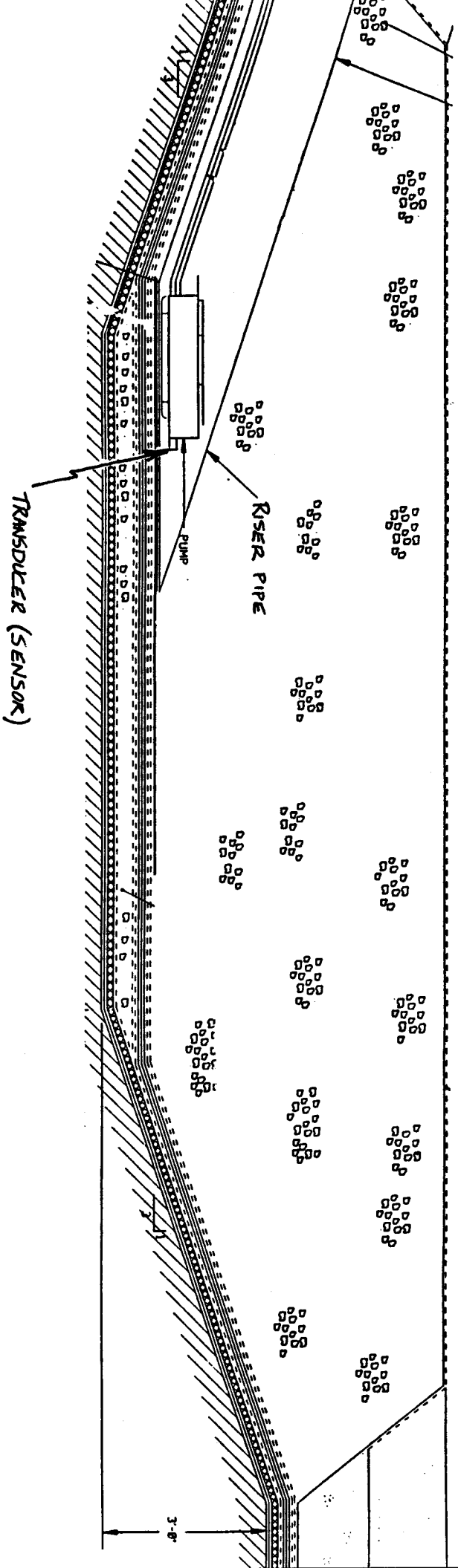


SUMP NO. 7 SUMP LAYOUT

NTS

Primary & Secondary Sumps Similar

PIEDMONT LANDFILL AND
RECYCLING CENTER
A DIVISION OF
WASTE MANAGEMENT OF
CAROLINA, INC.
KERNERSVILLE
FORSYTH COUNTY, NORTH CAROLINA



SUMP NO. 4 SUMP LAYOUT

NTS

Primary & Secondary Sumps Similar

PIEDMONT LANDFILL AND
 RECYCLING CENTER
 A DIVISION OF
 WASTE MANAGEMENT OF
 CAROLINA, INC.
 KENNESVILLE
 FORSYTH COUNTY, NORTH CAROLINA